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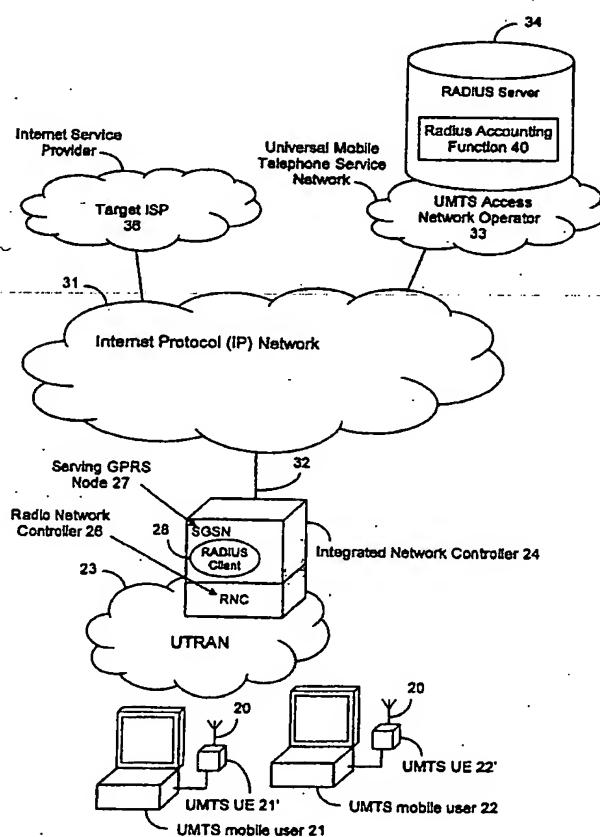
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(54) Title: USE OF RADIUS IN UMTS TO PERFORM ACCOUNTING FUNCTIONS



(57) Abstract: Internet web technology is used, and specifically a RADIUS (Remote Access Dial-In User System) server is used to keep records of connection time, data transmitted, session time and disconnection in a wireless access system.

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**USE OF RADIUS IN UMTS  
TO PERFORM ACCOUNTING FUNCTIONS**

**5 RELATED APPLICATIONS**

- U.S. patent application Serial No. 09/626,699, filed July 27, 2000, entitled "USE OF INTERNET WEB TECHNOLOGY TO REGISTER WIRELESS ACCESS CUSTOMERS," and U.S. patent 10 application Serial No. 09/626,700, filed July 27, 2000, entitled "USE OF RADIUS IN UMTS TO PERFORM HLR FUNCTION AND FOR ROAMING," which are continuations-in-part of U.S. patent application Serial No. 09/432,824, filed November 2, 1999, entitled "CELLULAR WIRELESS INTERNET ACCESS 15 SYSTEM USING SPREAD SPECTRUM AND INTERNET PROTOCOL (IP)", and published in equivalent form as European patent publication EP1098539.

**20 INTRODUCTION**

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The present invention is directed to the use of the Internet web technology to perform accounting functions in a wireless Internet access network.

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**BACKGROUND OF THE INVENTION**

- As disclosed in application Serial No. 09/432,824 of November 2, 1999 entitled CELLULAR WIRE INTERNET ACCESS 30 SYSTEM USING SPREAD SPECTRUM AND INTERNET PROTOCOL (IP), this describes a cellular wireless Internet access system

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There is therefore a need for allowing performance of accounting functions in a wireless access system in which the above disadvantages may be alleviated.

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#### SUMMARY OF INVENTION

In accordance with a first aspect of the invention there is provided a method of operation in a wireless access network system, as claimed in claim 1.

In accordance with a second aspect of the invention there is provided a wireless access network system, as claimed in claim 10.

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In accordance with a third aspect of the invention there is provided a RADIUS arrangement for use in a wireless access network system, as claimed in claim 19.

20 In accordance with a fourth aspect of the invention there is provided a network controller for use in a wireless access network system, as claimed in claim 21.

25 In accordance with a fifth aspect of the invention there is provided a computer program element comprising computer program means for performing the method of operation in a wireless access network system, as claimed in claim 22.

30 In a preferred form of the invention, there is provided a method of operating a cellular wireless Internet access

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FIGS. 2 is a diagram illustrating the method of the present invention.

## 5 DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

Referring now to FIG. 1, two typical users of the Internet access system are illustrated at 21 and 22. Each wireless access user has a personal computer PC and 10 UMTS user equipment (UE) 21' and 22' with a directly attached antenna 20 is connected by typical data connection such as an RS232, USB or Internet to the PC. The user equipment is termed a portable subscriber terminal, operating in conjunction with its associated 15 PC.

The wireless access user is described in the above co-pending application as a part of a UMTS/UTRAN system, the technique being described in the above co-pending 20 application, which communicates in a wireless manner, via a UTRAN network 23, to an integrated network controller (INC) 24. Such controller may be connected by wire or otherwise to an Internet system or web 31. As discussed in the above co-pending application, the controller 24 25 includes an RNC or Radio Network Controller 26, which controls and allocates the radio network resources and provides reliable delivery of user traffic between a base station and subscriber terminal. An SGSN (Serving General Packet Radio Service Node) 27 provides session 30 control. Lastly, a RADIUS element designated RADIUS client 28 is incorporated to provide authentication and

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access for the subscriber 21 or 22 with the RADIUS server 34 as indicated by the arrow 42. If there is confirmation of access and tier of service indicated by arrow 43, the RADIUS server then at step 44 tracks the 5 connect time for the user from this point. Then an accounting request in step 45, as shown by the arrow 46, is sent from the RADIUS client 28 to the RADIUS accounting function 40 and the RADIUS accounting function keeps records of data transmitted and other necessary 10 information in its accounting database and there is a response as shown by arrow 47. This may occur at repeated intervals 46', 46", 47' and 47" until a disconnect occurs as shown at step 48. Here the RADIUS server shown at step 49 keeps the disconnection record 15 together with all other information gathered in the subscriber's session in its accounting database; thus, all of the necessary accounting functions are provided. Such accounting messages are forwarded to the RADIUS accounting function 40 at configurable intervals; the 20 normal facilities of the RADIUS protocol for insuring reliable delivery are used. Thus this generates accounting records while the session is in progress and inherently is able to account for potentially very long duration Internet connection sessions while the sessions 25 are in progress rather than (as opposed to the previous system) only after they are concluded. This is analogous to long duration call records in telephone system billing records. When a session is terminated, a final accounting message is sent to the RADIUS server to report 30 the total connect time and total data sent and received for that wireless access network session. Accounting

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**WHAT IS CLAIMED IS:**

1. A method of operation in a wireless access network system, comprising the steps of:
  - 5 (a) providing a RADIUS arrangement with an associated RADIUS accounting function;
  - (b) a user accessing the network via wireless user equipment and via the RADIUS arrangement; and
  - (c) the RADIUS arrangement tracking access activity by the user and recording such activity in an accounting database associated with the RADIUS accounting function.
- 10 2. The method of claim 1, wherein the RADIUS arrangement tracks the user's connection time.
- 15 3. The method of claim 1, wherein the RADIUS arrangement tracks the user's volume of data transmitted.
- 20 4. The method of claim 1, 2 or 3, wherein the accounting database is updated upon user disconnection.

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- 25 5. The method of any preceding claim wherein the accounting database is updated at predetermined intervals of time to thereby accommodate long duration connection sessions.
- 30 6. The method of any preceding claim wherein the RADIUS arrangement receives information from a network controller of the system.

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15. The system of any one of claims 10-14, wherein the RADIUS arrangement is arranged to receive information from a network controller of the system.

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16. The system of claim 15 wherein the RADIUS arrangement comprises a RADIUS client at the network controller.

10 17. The system of any one of claims 10-16, wherein the system is a cellular wireless Internet access system.

18. The system of any one of claims 10-17, wherein the system is a UMTS system.

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19. A RADIUS arrangement for use in a wireless access network system, comprising:

a RADIUS server;

an associated RADIUS accounting function; and

20 the RADIUS server being arranged to track access activity by a user accessing the network via wireless user equipment and via the RADIUS server, and to record such activity in an accounting database associated with the RADIUS accounting function.

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20. The RADIUS arrangement of claim 19 further comprising a RADIUS client provided at a network controller of the system.

30 21. A network controller for use in a wireless access network system, the network controller having a RADIUS

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24. A method as in claim 23 where accounting requests  
are sent from the integrated network controller to said  
RADIUS server at predetermined intervals of time to  
5 thereby accommodate long duration Internet connection  
sessions.

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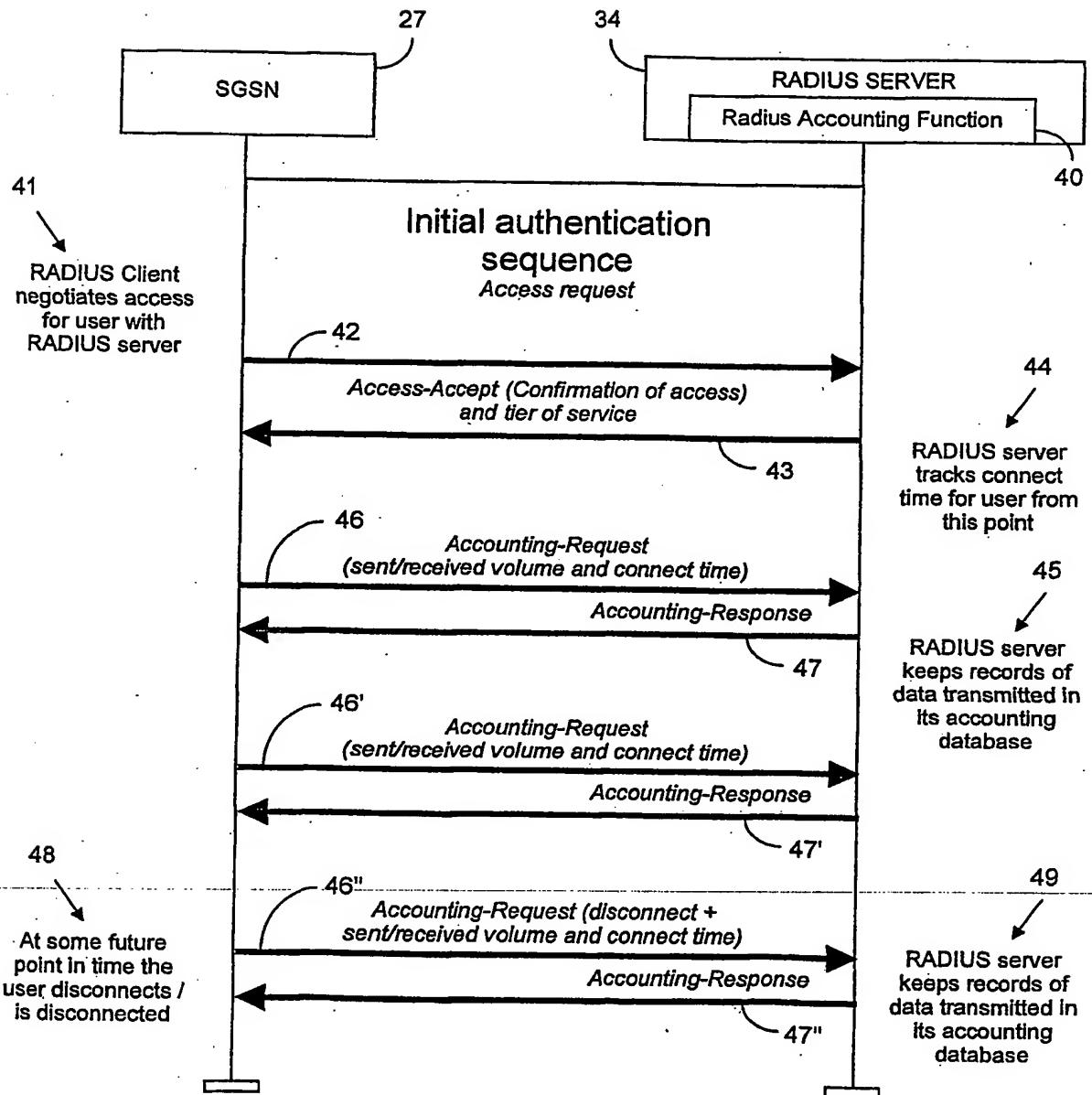


FIG. 2

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